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Study of preliminary phytochemical analysis of *Bacopa monnieri* (L.) wettst

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Abstract

A medicinal plant possesses curative properties mainly due to the presence of alkaloids, glycosides, saponin, carbohydrates, protein, phytosterols, flavonoids and tannin etc. They are naturally synthesized by the plants. The plants are important renewable source of raw materials for the production of variety of chemicals which can be utilized by mankind. It becomes necessary to find out the chemical constituents present in a particular medicinal plant which are used to cure the human and animal disease. An attempt has been made to correlate the biological activity with the chemical constituents of the plants or part used in medicine. In the present study, simple phytochemical screening procedures were carried out to find the various constituents present in the extract of petroleum ether, benzene, chloroform, acetone, ethanol of *Bacopa monnieri* (L.) Wettst. showing the presence of flavonoids, terpenoids, saponin, and cardiac glycosides, carbohydrates. The plant is used as ethnobotany and ethnoveterinary medicines.

Keywords: Phytochemical screening, *bacopa monnieri* (L.) Wettst. Ethno botany, ethnoveterinary

Introduction

Medicinal plants are considerably useful and in expensively essential for human and animal survival. They contain variety of active constituents that are used for the treatment of human and animal diseases, in health care and troubles. (Stary and Hans, 1998) ^[11]. The medicinal properties of plant can be significantly attributed to a variety of phytochemical constituents synthesized in different plant tissues. Most of the phytochemical constituents are considered as the fundamental source for the development of pharmaceutical industries and interpretation of herbal drugs. (Savitharanam *et al.* 2011) ^[12].

Phytochemicals are considered as non-nutritive chemicals produced by plants. They possess defensive or disease preventive properties. Primarily these chemical constituents are produced by plants for their own protection. The scientific investigation demonstrates that a number of phytochemicals can protect human civilization against various diseases. Hence such knowledge about the phytochemical constituents derived from the plant is advantageous and valuable for the production of different complex chemical substances (Veerachari and Bopaiah 2011) ^[12].

A medicinal plant possesses curative properties mainly due to the presence of alkaloids, glycosides, saponin, carbohydrates, protein, phytosterols, flavonoids and tannin etc. They are naturally synthesized by the plants. The plants are important renewable source of raw materials for the production of variety of chemicals which can be utilized by mankind. It becomes necessary to find out the chemical constituents present in a particular medicinal plant which are used to cure the human and animal disease. An attempt has been made to correlate the biological activity with the chemical constituents of the plants or part used in medicine. *Bacopa monnieri* (L.) Wettst. Locally called brahmi belongs to Plantaginaceae traditionally used in asthma, snakebite. In ethnoveterinary decoction is used to treat paralytic attack and cough and cold of animals. In ayurveda it is used as antistress and as a brain tonic for memory enhancing.

In the present study, simple phytochemical screening procedures were carried out to find the various constituents present in the extract of petroleum ether, benzene, chloroform, acetone, and ethanol of *Bacopa monnieri* L. showing presence of flavonoids, terpenoids, saponin, steroid and cardiac glycosides, carbohydrates. The plant is used as ethnobotany and ethnoveterinary medicines.

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Material and Methods

Plant material is collected from different region of Nimar. Tuber were thoroughly washed, shed dried, and then grind to fine powder. About 25 gm. powder of plant material was subjected to successive soxhlet extraction with 250ml. of various solvent i.e. petroleum ether, benzene, chloroform, acetone, ethanol for 8 hours. Qualitative estimation of some major phytochemical constituents such as alkaloids, flavonoids, glycosides, saponin, tannin, protein, carbohydrates, and physeteroidea was carried out by using standard methods.

Detection of alkaloids

To a few ml of filtrate, few drops of Wagner's reagent are added by the side of the test tube. Formation of reddish-brown precipitate indicates the presence of alkaloids.

Test for glycosides

About 3ml extract was mixed with dil.H₂SO₄, boiled and finally filtered. Equal volume of chloroform was added to cold filtrates. The organic solvent was separated and mixed ammonia solution. Ammonical layer turned pink or red indicates the presence of anthraquinone glycosides.

Test for carbohydrates

Extract was mixed with equal volume of Benedict's reagent in test tube. Solution was heated in boiling water bath for 5 min. It was turned green, yellow or red, indicates the presence of carbohydrates.

Test for saponins

Small amount of extract was shaken with little quantity of water. If foam produced persists for 10 minutes indicates the presence of saponins.

Test for tannin and phenols

To 2-3ml extract mixed with few drops of 5% FeCl₃ solution. Formation of deep blue black colour indicates the presence of tannin and phenols.

Test for flavonoids

Extract was treated with few drops of sodium hydroxide solution intense yellow colored was formed It becomes colorless on addition of dilute acid, indicates the presence of flavonoids.

Test for Phytosteroids and terpenoids

About 2ml extract was with mixed chloroform and then added 1-2ml acetic anhydride and 2 drops of conc.H₂SO₄ drawn from the side of test tube. Appearance of first red, then blue and finally green colour indicates the presence of steroids.

Test for protein

About 3ml extract was treated with 4% sodium hydroxide and few drops of 1% copper sulphate solution. Formation of purplish violet or pink colour indicated the presence of proteins.

Result and Discussion

The result of the preliminary phytochemical screening of *Bacopa monnieri* (L.) Wettst. In table shows the presences of different phytochemicals prepared in different solvent extracts. Flavonoids, terpenoids, saponin, steroid and cardiac glycosides, carbohydrates are present in the test. Due to this phytochemical compound the plant used against different human and animal ailments.



Fig 1: *Bacopa monnieri* (L.)Wettst.

Bacopa monnieri (L.) Wettst.
Family-Plataginaceae

Table 1: Qualitative chemical examination of various extracts

Plant parts	Test	Reagent used	Petroleum ether extract	Benzene extract	Chloroform extract	Acetone extract	Ethanol extract
Leaves	Alkaloids	Mayer's Dragendorff's Hager's Wager's	+ve	+ ve	+ ve	+ ve	+ ve
	Glycosides	Borntrager's Legal Test	+ ve	+ ve	- ve	- ve	+ ve
	Saponin	Foam Test Froth Test	- ve	+ ve	+ ve	+ ve	- ve
	Tanin and Phenolic compound	5% Ferric chloride Bromine water Acetic acid Test	+ ve	- ve	+ ve	- ve	+ ve
	Protein	Biuret's Xanthoproteic Test	+ ve	- ve	- ve	+ ve	+ ve
	Carbohydrate	Fehling's Molisch's Benedict's Test	- ve	- ve	- ve	+ ve	+ ve
	Phytosterols	Libermann's Liberman-Burchard's Test	- ve	- ve	- ve	- ve	- ve
	Flavonoids	Alkaline reagent Lead acetate Shinoda Test	- ve	- ve	+ ve	- ve	+ ve

Conclusion

The presence of various phytochemicals such as alkaloids, flavonoids, saponin, tannin phenolic compound and cardiac glycosides in the plant of *Bacopa monnieri* (L.) Wettst. confirms that this plant species is a potent source for modern drugs using in different ailments of human as well as animals. The present study not only for preliminary contribution to the medico-botany investigation but due to the presence of such phytochemicals also shows a way for pharmacological research in future for the discovery of new sources of drugs for human and animals also.

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